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ABSTRACT

Types of utterances used by mothers in two different situations with children 13- to 14.5 months old were compared. A set of toys was provided for free play. The toys were also represented in a picture book. Mothers' utterances were classified into five categories: description, attention focus, language elicitation, label, and behavior regulation. Mothers used proportionally more directives in the free play setting, and more focus and label utterances in the book setting. Mothers' use of a category in one setting did not predict its use in the other. Frequent sequences of utterance types used to engage attention, interact, and change topics appeared in both settings. In book reading, sequences tended to be directed toward labeling and describing, whereas in free play, sequences were frequently organized around a child's action. The two situations differed in the strategies mothers used to maintain task-appropriate behavior. It is concluded that maternal speech may demonstrate ways in which language can be used to encode situation-specific goals and shifts in joint attention. Related materials are appended. (Author/RH)

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Situational Differences in the Type of Utterances Mothers Use with Thirteen-Month-Old Children

Presented at the Society for Research in Child Development Conference, Kansas City, MO, April, 1989.

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Students of linguistic development became interested in caregiver speech to young children in an effort to illuminate environmental influences on language aquisition. This study focused on two aspects of the semantic foci of caregiver utterances. First, we asked whether the pattern of foci used by a particular caregiver is consistent across situations or is responsive to changes in context. Secondly, do different contexts predictably influence most caregivers to alter their patterns of semantic foci in similiar ways? One characteristic of context that may affect semantic focus is the interactive situation in which the speakers find themselves. Two situations, formerly used in past research, were examined in this study- that is, looking at a picture book and free play.

Book reading is a relatively structured situation in which caregiver and child focus the majority of their attention upon the pictures and/or story of a book. Snow and Goldfield (1983) studied the interaction of one mother-child dyad in a joint book-reading situation over a period of eleven months. They described the book reading situation as structured and routinized, aspects they claimed were crucial to the linguistic development of their subject, age 1;10. Snow and Goldfield characterized parental utterances in their situation as being used to elicit narratives, and discuss temporal sequencing, motives, consequences, causes and effects. It is important to note that their subject was past the one-word stage, and the book they used was filled with many complex pictures. They believe that these factors account for the fact that the parent in their study did not rely predominantly on labeling while interacting with a book, as previous observations of mother-child interactions (Ninio and Bruner, 1978, to be discussed next) had found.

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Ninio and Bruner (1978) investigated maternal speech in a joint book reading situation. They observed one mother-child dyad from the time the child was 0;8 to 1;6 in age. Utterances were characterized as having one of four functions: attentional vocative (e.g. "look"), query (e.g. "What is that?"), label (That is a flower"), and feedback (e.g. "Yes, that's a good girl"). They found that a significant majority of this mother's utterances could be classified as labels at all age levels of this child. They concluded that joint book reading (with a non-

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narrative book) can constitute an important teaching tool in children's aquisition of labels.

Free play is a much less structured activity but one that is more common in the lives of children and their caregivers than is joint picture book reading (Goddard, Durkin and Rutter, 1985). In response to the Ninio and Bruner (1978) claim that joint book reading is important in the teaching of labels, Goddard, et al. investigated the extent to which labeling is the conversational focus in other situations, specifically free play. They observed 8 subjects, each at three ages, 1;0, 1;6, 2;0, all with their mothers. The semantic focus of maternal utterances was coded into one of six categories: activity, evaluation, nomination, perceptible physical characteristics, object's function, and referencing, (e.g. "Those blocks"). They found that the semantic focus of parental speech in 40% of the utterances made was activity and not nomination as Ninio and Bruner (1978) found in the book reading situation. Goddard et al. concluded that the focus of maternal speech differs from situation to situation. It is important to note that the free play context in this study was unusual in that the only objects provided were things such as tissue, paper cups, and a table.

Jones and Adamson (1987) provided a more "normal" free play situation, complete with toys, and compared of the focus of caregiver speech in the two situations, free play and joint book reading. Thirty-two children and their mothers participated, 16 first-borns and 16 later-borns, all between 18 and 23 months. Each of the 32 dyads was observed in the two situations- free play and joint book reading. Jones and Adamson classified utterances into three categories based on the focus of attention: referential, social regulative, and metalingual (c.f. Jakobson, 1960). Utterances characterized as having a social regulative function focused attention on the interactors or the communication channel connecting them. When an utterance focused attention on a specific object or event in the environment, it was classified as referential. If the speaker focused exclusively on the code or the language then the utterance was coded as metalingual.

In the Jones and Adamson study, the content of speech was compared in two situations. In the free play situation, mother and infant were observed interacting with a set of experimenter-provided toys. Observations in the joint picture-book setting were of mother and child jointly looking at a set of seven picture books with minimal story content. Situation was found to significantly influence the foci of maternal speech. Mothers used more referential and metalingual and fewer social regulative utterances in the book reading situation as compared to the free play setting. Overall, mothers made fewer utterances during free play than they did when viewing books with their infants.

The present study was undertaken to further investigate the stability of parental utterance content in different situations. Although this study was to some extent an attempt to replicate

Jones and Adamson (1987), there were some differences. The children in this study were 13 months old while those of Jones and Adamson were 18 to 23 months old. It is plausible that the functions of parental speech during the time when children are just learning to speak could be different than when children have been speaking for several months. In this study, the comparison of situations was better controlled because the toys available in the free play situation were also be the same objects as those represented pictorially in the joint book reading situation.

Method

Participants

The participants of this study were mother-infant dyads who were part of a larger study of language and cognitive development. The infants ranged from 13 to 14.5 months old. There were 8 males and 8 females, and one half were first-borns while the other half were later-borns. Subjects' names were obtained from newspaper birth announcements. Parents were contacted by letter and by phone. This method of contacting subjects in this area yielded an approximately 2/3 participation rate.

Procedure and Materials

Mother-infant dyads were videotaped in laboratory facilities set up as a playroom. Each was observed in two different settings: a joint book reading task and a free play situation. The order of presentation of these settings was counterbalanced across subjects.

Free play setting

The objects for a free play setting were a ball (6 inches in diameter), a hat (actual child-sized baseball cap), flowers (silk in styrofoam and green flower pot), a train (8 inch plastic toy that could be disassembled), a brush (adult-sized plastic), a telephone (9-10 inch plastic toy with ringing sound), blocks (wooden and of different shapes and colors), a pan (kitchen-sized light aluminum fry pan with a plastic handle), a spoon (12 inch brown plastic), a stroller (18 inch doll-sized), pop beads (toy in different colors), a box (1' x 2', cardboard), a cardboard tube (from paper towel), a truck (15" long dump truck with dumping lever), a rabbit (6 inch brown, stuffed), a bear (12 inch brown, stuffed) and a watering can (6 inch plastic toy).The toys provided for the free play were chosen to be like the objects depicted in the book used for the book task. The experimenter instructed the mother to relax and play with her infant as she would if they were home. The experimenter then left the dyad alone for a period of approximately 10 minutes.

Book Setting

Thirteen pictures for the book reading situation were chosen

from a variety of books marketed for toddlers, such as What's Teddy Bear Doing (illustrations by Helmut Spanner, Price/Stern/Sloan Publishers, 1983) and Teddy's Toys (Michelle Cartlidge, Simon and Schuster, Inc., 1985). These pictures were selected also for simplicity; three representative examples are shown in Appendix 1. One (a toddler playing with pots and pans) was a photograph while all the others were color drawings such as those which commonly illustrate children's books. Each picture contained an agent (child or teddy bear) interacting in a conventional fashion with a familiar object, e.g. child using a spoon to bang on pots. Three of the agents were identifiable as females, one was male and two were gender neutral. The depicted objects were members of the same classes as those used in the free play situation. For example, the depicted train was not the exact toy train presented for manipulation, but it was a toy train.

The experimenter instructed each dyad to jointly view and discuss the pictures in the book as they would if they were at home. Then, the experimenter left the pair alone in the playroom for approximately 5 minutes. Pilot work indicated 5 minutes to be a maximum for the continued shared attention of the dyad in the book situation.

Scoring

Maternal utterances were first transcribed from videotape in standard English orthography. Using these transcriptions, raters then classified maternal utterances on the basis of their function into the three categories used by Jones and Adamson, plus another three to be discussed later. The first category was "referential"- these utterances served to focus the attention of the hearer on a specific object or event in the communicative context, e.g. "That is a big bear". "Metalingual" utterances focused the attention of the hearer on the linguistic code being used, for example, "What is this called?" The last category was "social regulative". These utterances served to draw the attention of the hearer to the speech interactors and the communicative channel connecting them- "I don't like it when you do that". These categories were derived from the work of Jakobson (1968) and were used by Jones and Adamson (1987).

When coding was actually begun, it became apparent that many utterances did not fall easily into one of these classes. Therefore, it seemed advisable to divide these general types of utterances into five smaller categories The general "metalingual" class was divided into "language elicitation" (those utterances which attempt to elicit language from the child, e.g. "What is that?") and "labeling" (which occured when mother named the object, e.g. "That's a hat"). Finally, the "social regulative" category was also too broad and was split into "focus" utterances (which took the form of a directive but tended to orient the child's attention on a particular object, e.g. "Look at the train") and "directives" (speech used to direct the child's behavior or suggest play, e.g. "Come here"). The "referential"

category was renamed "world object and/or event description". Those utterances which did not fall into any of these expanded categories were placed into an "unclassifed" group. The complete coding system rules are shown in Appendix 2.

Results and Discussion

The means which were found for each of the dependent variables are shown in Table 1. The data were analyzed using a

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Insert Table 1 about here

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2 (situation, within) x 2 (birth order, between) ANOVA for each of the dependent variables. The main effect of situation was significant for three of the dependent variables. Mothers used proportionally more social directive utterances in the free play situation (F=52.52, p>.0001) than when engaged with the book. In the book situation, focus (F=15.24, p>.0016), and labeling utterances (F=19.62, p>.0006) occured in higher proportions than in the free play situation.

It is obvious that the mothers probably perceived these situations as requiring different kinds of communication. They patterned their language use differently in the two situations. There were no significant correlations of the same variable across situation; for example, language elicitation in free play did not correlate with language elicitation in the book situation. This suggests that the situations are understood as different and as requiring different language styles. It could also be the case that the categories of utterances serve different purposes in the two situations. The lack of one-to-one correspondence between categories suggests that context may have a greater effect on patterning the content of mothers' utterances than a general maternal style. For example, those mothers who are "directive" in free play are not necessarily the highest in "directives" in the photobook situation.

In the book situation, the most frequent utterances were directive, label, and focus. This suggests that some utterances received higher priority for use. Ninio and Bruner (1978) outlined four types of key utterances and the typical cycles in which these occur: attentional vocative ("Look"), query ("What's that?"), label ("It's an X"), and feedback utterances ("Yes"). Ninio and Bruner did not include social regulative utterances (aimed at directing the child's behavior), since they began analysis only <u>after</u> the child's attention was established. We did not include a separate category of feedback utterances in our analysis as 13 month-olds give very little in the way of a verbal response for their mothers to evaluate. The frequencies observed in our data are consistent with the idea that mothers seek to maintain proximity to the book, point out interesting things and label them.

There is not a clear central task in the free play activity as there is in the book session, so the situation does not demand proximity of mother and child. Under these circumstances, "directive" utterances include not only behavior directives aimed at controlling the location and behavior of the child, but also include play suggestions. The latter might be expected to make up a relatively high proportion of the mother's interaction with the child in the free play situation. In fact this is the case; mothers did spend nearly 50% of their utterances during freeplay in directive utterances, a significantly higher proportion than in the book situation.

To explore the notion of sequential use of utterance types, we examined the transcripts for common pairs and trios of utterance types. Tables 2 and 3 display the frequencies of different pairs and trios in different situations. As is evident

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Insert Tables 2 and 3 about here

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in the data on pairs of utterances, mothers had a high likelihood of repeating the same utterance type. For the present purposes, we elected to analyze only non-redundant pairs and trios, since we were interested in how different utterance types are orchestrated in conversations.

In order to tell whether, given an utterance of type A, an utterance of type B was likely to follow, we used a z-score formula based on Allison and Liker (1982) which may be found in Appendix 3. We generalized this formula to apply to the analysis of trios (see Appendix 4). Significant pairs and trios of utterance types in the book situation are marked with an asterisk in Tables 2 and 3 and depicted in Figure 1. As one can see, mothers tended to orient sequences of utterances toward labeling and describing the pictures. Generally, directive utterances tended to be followed by one which focused the child's attention on an object or labeled it. Focusing tended to be followed by labeling or describing. Examples may be seen in Appendix 5.

A quite different set of significant sequences appeared in the free play situation, each marked with asterisk in Tables 2 and 3 and depicted in Figure 2. In this situation, not surprisingly, mothers' utterances seemed to be centered around directives (which included play suggestions). These would alternate with other utterance types. Examples of these sequences may be seen in Appendix 5.

Conclusion

To our knowledge, this is the first systematic controlled examination of situational effects on mothers' speech to year-old infants. It is apparent that mothers are sensitive to the utility of different types of utterances in different situations. Depending on the situation in which they found themselves, the mothers in this study employed different types and typical sequences of utterances.

Primarily, the results of this study do not contradict those of Jones and Adamson (1987). There was a higher proportion of directive utterances in the free play situation although focus utterances were significantly higher in the book situation. There was no significant difference in language elicitation utterances although the sub-category "label" occurred significantly more in the book situation. The present study extended and examined more deeply the phenomena reported by Jones and Adamson and gained a crucial structural advantage by providing a comparable set of topic objects in the two situations. With this added control, it is likely that the form (three-dimensional versus two-dimensional) of the object makes a large difference in how dyads choose to interact with it. Different linguistic patterns for the two situations can not be construed as due to the presence of different potential subject matter because in this study, the real objects and the pictured objects are comparable. Following is a sample dialogue to illustrate this point.

Situation	Object	Mother's Words	Code & Comments
Free play	Truck	Ah, look it, they've got a neat truck.	Description of the object.
		See.	Focus; Orients child's attention.
		You can put this stuff in there.	Directive; Makes play suggestion.
		Then-look it...	Focus; Orients child's attention.
		Put some stuff in the truck.	Directive; Makes play suggestion.
		Now you dump it out.	Directive; Makes play suggestion.
		All gone.	Description.
		Put the blocks in the truck.	Directive; Makes play suggestion.
Book	Truck	Look at- the boy pushing the truck.	Description of the action of object
		The boy's pushing the truck.	Description of action of object.

The difference between our book situation and that of Jones and Adamson needs further exploration. They report using

"seven picture books with minimal story content" while we, to obtain better control, provided one photo album with isolated pictures of objects inside. There was no story content and, presumably, not enough continuity of characters and background to suggest a narrative. Future research might help to clarify the comparability of those two situations. However, it is important to note that the book used in this study is not atypical of books available and marketed for one- year olds.

Mothers used different patterns of utterances to maintain the child's involvement in the free play and book situations. Typical sequences in the book situation tended to be directed toward labeling and describing the pictures, whereas typical sequences in freeplay revolved around behavior/play suggestion. These two situations may offer language teaching/learning dyads opportunities to focus on two different functions of language: providing information (book) and requesting actions (play). Future research should investigate whether typical sequences of utterance types coincide with topic maintenance and change. It would be interesting to observe whether these two conversational settings allow mothers to use different strategies to initiate, maintain and disengage from joint attention maintenance. Further research should also take into account situational differences when attempting to determine maternal support for early language aquisition.

Bibliographical Sources

Allison, P. and Liker, J. (1982). Analyzing sequential categorical data on dyadic interaction: A comment on Gottman. Psychological Bulletin, 91(2), 393-403.

Bates, E., Camaioini, L., and Volterra, V. (1975). The aquisition of performatives prior to speech. Merrill-Palmer Quarterly, 21(3).

Gleitman, L., Newport, E., and Gleitman, H. (1984). The current status of the motherese hypothesis. Journal of Child Language, 11, 43-79.

Goddard, M., Durkin, K., and Rutter, D. (1985). The semantic focus of maternal speech: A comment on Ninio and Bruner (1978). Journal of Child Language, 12 209-213.

Jakobson, R. (1960). Linguistics and poetics. In T.A. Sebeok (ed.), Style in Language, Cambridge, MA, MIT Press, 85-122.

Jones, C. and Adamson, L. (1987). Language use in mother-child and mother-child-sibling interactions. Child Development, 58, 356-366.

Nelson K. (1973). Structure and strategy in learning to talk. Monographs of the Society for Research in Child Development, 38 (1-2, Serial number 149).

Ninio, A. and Bruner, J. (1978). The achievement and antecedents of labelling. Journal of Child Language, 5, 1-15.

Searle, J. (1969). Speech Acts: An Essay in the Philosophy of Language, London, Cambridge University Press.

Snow, C. and Goldfield, B. (1983). Turn the page please: Situation specific language. Journal of Child Language, 10, 551-569.

Table 1 Means for the frequencies of the dependent variables.

Variable	Freeplay	Book
Directive	192	53
Focus	16	21
Description	25	13
Label	20	40
Metalingual	24	20
Totals:	277	147

Table 2 Frequencies of pairs of utterances in each situation

FREEPLAY

1st	2nd utterance in the pair				
	Directive	Focus	Label	Lang. Elicit.	Describe
Directive	974*	63*	45*	71*	119*
Focus	46*	37*	12	8	16
Label	52*	3	46*	9	29*
Lang.elicit.	64*	0*	18*	73*	22
Describe	134*	16	21	16	140*

*Marked frequencies were significant, $p < .05$

BOOK

1st	2nd utterance in the pair				
	Directive	Focus	Label	Lang. Elicit.	Description
Directive	139*	44*	32	11*	21
Focus	21	36*	41*	22*	29*
Label	33	30	151*	19	49*
Lang. Elicit.	17	9	36*	33*	19*
Describe	33	20	29	22*	55*

*Marked frequencies were significant, $p < .05$.

Table 3 Frequencies of trios in each situation (*=$p<.05$)

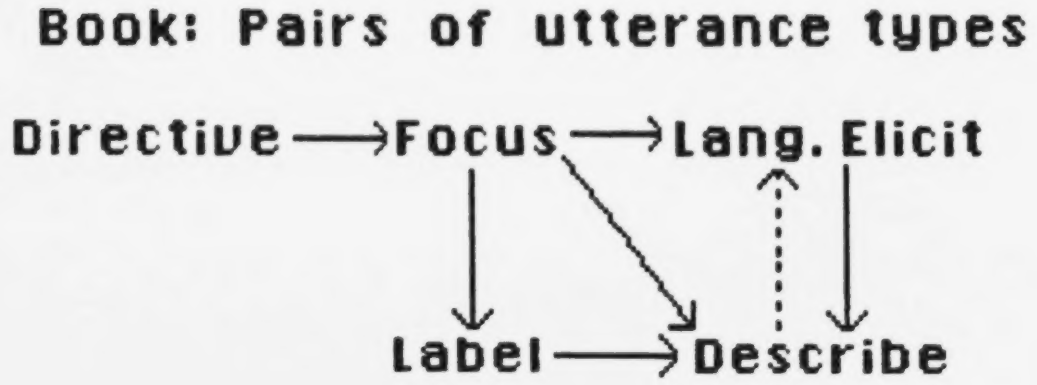
FREE PLAY

1st pair	3rd utterance				
	Directive	Focus	Label	Lang. Elicit.	Describe
Dir./Foc.	28	--	8	3	12
Dir./Label	21	1	--	5	10
Dir./Elicit.	38	0	9	--	11
Dir./Des.	66*	9	9	6	--
Foc./Dir.	--	15*	3	2	8
Foc./Label	7	1	--	1	2
Foc./Elicit.	7*	0	1	--	0
Foc./Des.	8	0	1	0	--
Label/Dir.	--	7	7	2	16*
Label/Foc.	1	--	2	0	0
Label/Elicit.	7	0	1	--	1
Label/Des.	10	1	6	0	--
Elicit./Dir.	--	5	8	15*	15
Elicit./Foc.	0	--	0	0	0
Elicit./Label	6	1	--	2	6
Elicit./Des.	10	3	1	3	--
Des./Dir.	--	10	9	21*	38*
Des./Foc.	8	--	1	3	2
Des./Label	10	0	--	0	8
Des./Elicit.	2	0	4*	--	7*

BOOK

1st pair	3rd utterance				
	Directive	Focus	Label	Lang. Elicit.	Describe
Dir./Foc.	10	--	9	9	12*
Dir./Label	5	1	--	5	14*
Dir./Elicit.	2	3	3	--	3
Dir./Des.	4	1	7	3	--
Foc./Dir.	--	8*	3	0	2
Foc./Label	7	9	--	3	15*
Foc./Elicit.	6	1	7	--	5
Foc./Des.	3	6	3	4	--
Label/Dir.	--	6	8	1	5
Label/Foc.	3	--	15*	3	7
Label/Elicit.	3	1	11*	--	3
Label/Des.	11	7	14	6	--
Elicit./Dir.	--	4	2	3	2
Elicit./Foc.	2	--	2	4*	1
Elicit./Label	11	6	--	5	8
Elicit./Des.	5	2	2	3	--
Des./Dir.	--	8	7	5	4
Des./Foc.	5	--	6	1	7*
Des./Label	5	6	--	4	7
Des./Elicit.	2	3	8	--	4

Figure 1 Depiction of Significant Sequences in the Book Setting



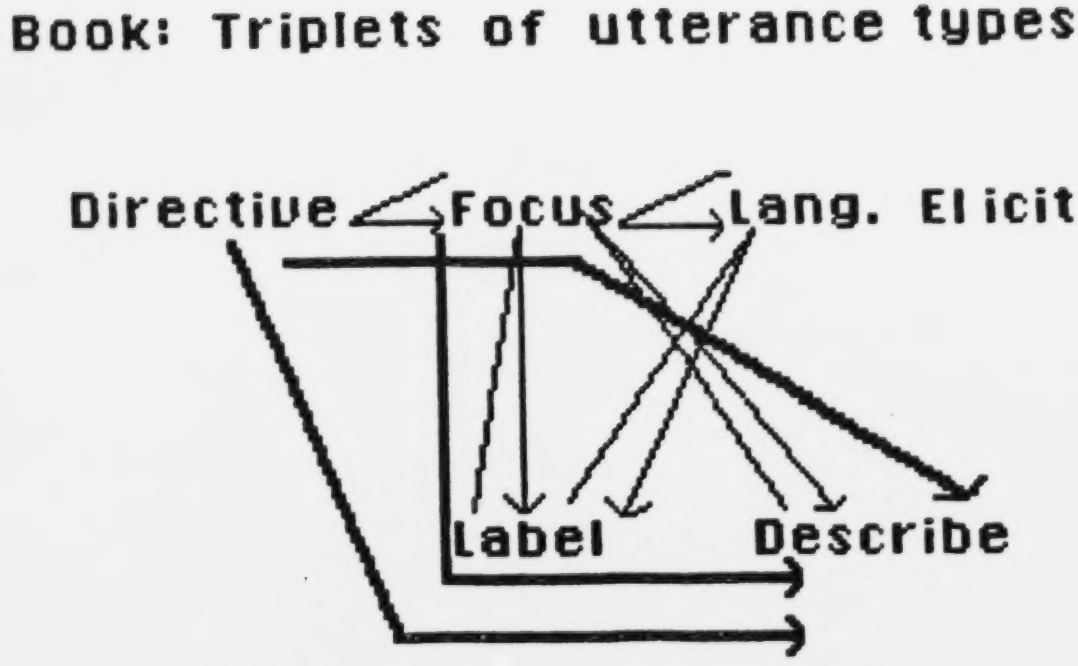
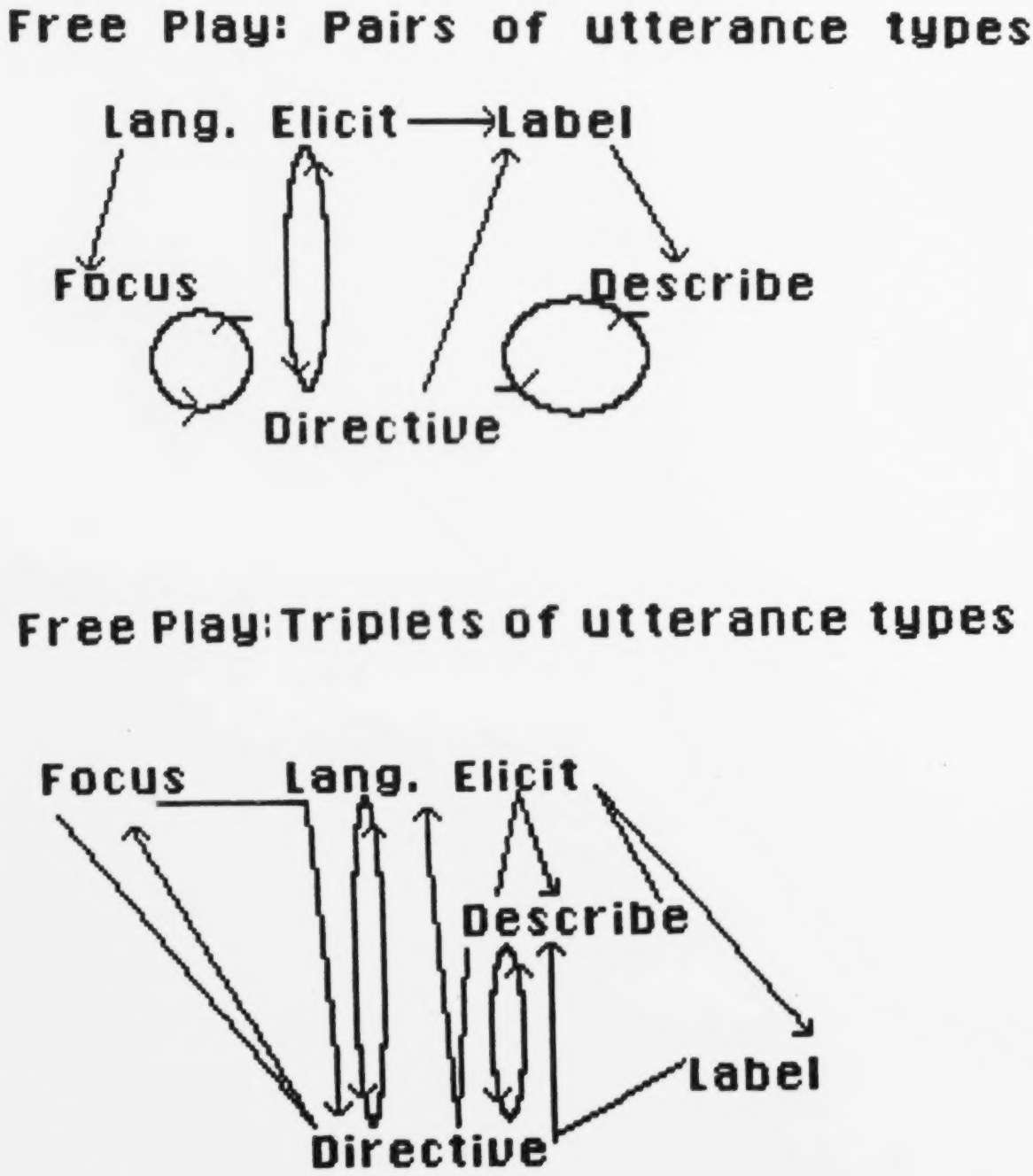
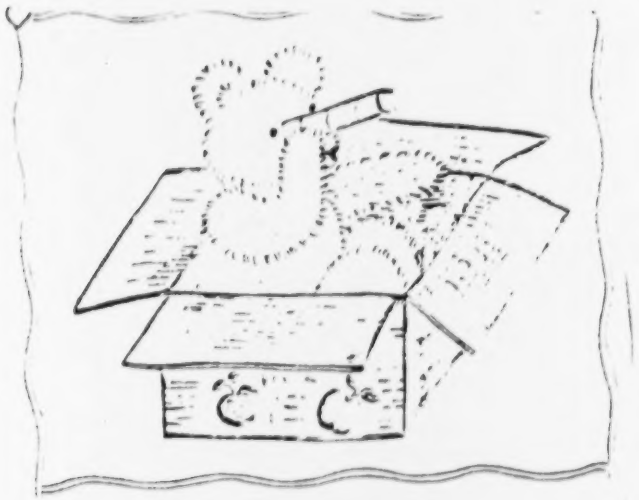


Figure 2 Depiction of Significant Sequences in the Free Play Setting



Appendix 1 Examples of Pictures in the Book Setting



Appendix 2 Coding Rules for Maternal Speech Functions.

We were interested in the aspect of the environment about which the mother is attempting to communicate with her child. There are three basic aspects of the environment: self and child, objects and language.

Self and child: these utterances concern the interactors in the communicative context.

Directive- M. directs the child's actions

"Go get the baby"
"You have to stay here"

- M. questions the child about specific actions
  "Where are you going?"
  "Are you going to cook dinner?"
- M. comments on her own or child's actions
  "I'm going to play with the stroller"
  "You're going to hurt Mommy's nose"
- M. and child engage in routinized activities such as songs and verses.
- Other examples: "Hey", "Billy!", "Uh oh", "Where is the ___" and "Here" (when used to direct attention).

Focus- This is a special sub-category of social regulative utterances which employ a directive to focus the child's attention on an object as opposed to the actions of mother or child.

-"Look, a doggie"
-"See the truck"
-"Here's a telephone"

Object: These utterances communicate information about the properties of an object, other than its label.

Descriptive - these utterances describe or comment on static properties of an object.

- "Such a nice birdie"
- "Those are orange carrots"
- Colors, when used to modify a noun.
- "There it is"
- "All gone"
- "Is the truck full of blocks?"

Utterances in this category may also describe or comment on the action or potential action of an object.

-"Wow, that truck goes fast"
-"A phone rings"
- The actual noise made by an object "Briiing"
- "What can you do with this"

Language: These utterances are concerned with the actual code or language used to communicate.

Label- this category is for labels of objects

- " Oh, that's the doggie' eye"

- " That is a truck"
- "Watering can"
- "Where is the bear?" (emphasis on the name)
- "Is that a little stroller like yours?"

Language Elicitation- this category includes when mother tries to elicit language from the child or when she imitates or expands on something that the child has said.

- "What is that?"
- "Can you say doggie?"
- M. says "oh, you'll be right back?" after c. says "Be back"
- "Say,'teddy'"
- Colors, when used in a contrastive sense for teaching purposes. "A yellow block and a blue block".
- "Yes" when in response to a child utterance or request.
- "Huh?" when used to elicit futher communication from the child.

Unclassified-Other utterances with less clearly defined comunicative purposes in the conversation. Examples: "Darn", "Hmm", "Oh".

Appendix 3 Z-Scores used for pairs (From Allison and Liker, (1982)

Allison and Liker's Formula:

They were analyzing transcripts of husband (H) and wife (W) conversations. They divided the pairs (W_t, H_{t+k}) into two groups: those in which $W_t=1$ and those in which $W_t=0$. They let m_1 be the number of times that $W_t=1$ and m_0 be the number of times that $W_t=0$. Within each group, they calculated the proportion of times that $H_{t+k}=1$. These two proportions are denoted by $p_{H|1}$ and $p_{H|0}$. Their test statistic was

$$z_1 = \frac{p_{H|1} - p_{H|0}}{\sqrt{p_H(1 - p_H)\left(\frac{1}{m_1} + \frac{1}{m_0}\right)}}$$

For these data, excluding all redundant utterances,

$$z = \frac{\left(\frac{\#\text{ pairs of interest}}{\#\text{ first type}}\right) - \left(\frac{\#\text{ second type} - \#\text{ pairs of interest}}{\#\text{ total utterances} - \#\text{ first type}}\right)}{\sqrt{\left(\frac{\#\text{ second}}{\#\text{ Total utts.}}\right)\left(1 - \frac{\#\text{ 2nd}}{\#\text{Total utts.}}\right)\left(\frac{1}{\#\text{ 1st}} + \frac{1}{\text{Tot}-\#\text{1st}}\right)}}$$

Example:

Book: Given F, is L more likely to follow than by chance?
#FL = 41
Total non-redundant utterances = 801
non-redundant F = 119
non-redundant L = 166

$$\frac{\left(\frac{41}{119}\right) - \left(\frac{166 - 41}{801-119}\right)}{\sqrt{\frac{166}{801}\left(1 - \frac{166}{801}\right)\left(\frac{1}{119} + \frac{1}{801-119}\right)}} = 4.55$$

1st utt		F	Other	
2nd	L	41	125	166
	Other			
		119	XX	801

Numerator computes conditional probability of L given F then subtracts conditional probability of L given anything else.

Appendix 4 Z-score used for trios

For the trios, excluding all redundant utterances,

$$z = \frac{\left(\frac{\#\ \text{trios of interest}}{\#\ \text{first pair}}\right) - \left(\frac{\#\ \text{All third type} - \#\ \text{trios}}{\#\ \text{total pairs} - \#\ \text{first pair}}\right)}{\sqrt{\left(\frac{\#\ \text{third type}}{\#\ \text{Total utts.}}\right)\left(1 - \frac{\#\ \text{3rd}}{\#\ \text{Total utts.}}\right)\left(\frac{1}{\#\ \text{Pairs}} + \frac{1}{\#\ \text{Tot pairs} - \#\ \text{pair}}\right)}}$$

This study compared the types of utterances produced by mothers to their 13-14 month old infants in two different situations. A standard set of toys was provided for free play. The same objects were represented in a picture book. Mothers' utterances were classified into five categories: description, attention focus, language elicitation, label, and behavior regulation.

Mothers used proportionally more directives in the free play and more focus and label utterances in the book setting. Mothers' use of any given category in one setting did not predict its use in the other setting. Frequent sequences of utterance types to engage attention, interact, and change topics appeared in both settings. In book reading, these sequences tended to be directed toward labeling and describing, whereas in free play these sequences were frequently organized around a child action. The two situations differed in the strategies mothers used to maintain task appropriate behavior.

Maternal speech may demonstrate how language can encode situation-specific goals as well as shifts in joint attention.